

REMARKS

The Office Action dated December 21, 2004, has been received and carefully noted. The above amendments to the claims, and the following remarks, are submitted as a full and complete response thereto.

Claim 1 is amended to more particularly point out and distinctly claim the subject matter of the invention. No new matter is added. Applicant submits that the amendment to claim 1 is not made in response to any statutory rejection and that the claims are entitled to their full range of equivalents. Thus, claims 1-44 are pending in the present application and are respectfully submitted for consideration.

Claims 1-6, 9-14, 16-23, 25-40 and 42-44 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 6,148,410 (Baskey et al.) in view of U.S. Patent No. 6,556,547 (Srikanth). The Office Action took the position that Baskey taught all the elements of these claims except that the protocol is an Open Shortest Path First (OSPF) protocol. The Office Action then alleged that Srikanth provided the elements of these claims missing from Baskey. Applicant respectfully traverses the obviousness rejection and submits that the cited references, either alone or in combination, do not disclose or suggest all the features of any of the presently pending claims.

Claim 1, upon which claims 2-5, 9 and 10 are dependent, recites a link protocol redundancy method. The method includes providing a router having an active processor. The method also includes coupling a standby processor to the active processor. The method also includes forwarding network link protocol information from the active

processor to the standby processor for synchronizing link configuration and link protocol states of the active processor at the standby processor upon coupling of the standby processor to the active processor. The method also includes switching the router to the standby processor when a failure is detected at the active processor. All states of the link protocol immediately function as if the failure had not occurred.

Claim 11 includes some of the features of claim 1, as well as other features, but is drawn to an OSPF protocol redundancy method.

Claim 12 includes some of the features of claim 1, as well as other features, but is drawn to a link protocol redundancy method.

Claim 13, upon which claims 14 and 16-18 are dependent, recites a method for implementing OSPF redundancy. The method includes providing a router having an active processor means and a standby processor means. The method includes building a hidden OSPF interface on the active processor means and a hidden OSPF interface on the standby processor means. The method also includes connecting the hidden OSPF interface of the active processor means to the hidden OSPF interface of the standby processor means over a communications link. The method also includes synchronizing an OSPF routing database using an OSPF protocol over the hidden OSPF interface. The OSPF routing database is synchronized when the hidden OSPF interface of the active processor means and the hidden OSPF interface of the standby processor means reach a full adjacency state. The method also includes transferring OSPF protocol information from the hidden OSPF interface of the active processor means to the hidden OSPF interface of the standby processor means over the communications link to mirror states of

the active processor means and the standby processor means. The method also includes removing the hidden interface of the active processor means and the hidden interface of the standby processor means. The method also includes assuming control by the standby processor means when a failure is detected in the active processor means.

Claim 19, upon which claims 20-23 and 25-36 are dependent, includes some of the features of claim 1, as well as other features, but is drawn to a system for providing link protocol redundancy in a router.

Claims 37 and 38 include some of the features of claim 1, as well as other features, but are drawn to systems for providing open shortest path first (OSPF) protocol redundancy in a router.

Claim 39, upon which claims 40-44 are dependent, includes some of the features of claim 13, as well as other features, but is drawn to a system for implementing OSPF redundancy in a router.

As discussed in the specification, examples of the present invention provide improved redundancy that is implemented as a link level protocol running over IP having a backup link level process in total real time synchronization to enable an expeditious switchover when a failure occurs on an active control card. During an initial synchronization, all network link protocol information from the active processor is forwarded to a standby processor. Any updates of network link protocol information are immediately forwarded to the standby processor in an orderly and controlled manner. Upon failure of the active processor, the router is switched to the standby processor and all protocol operations are performed on the standby processor. Neighbor routers do not

notice any difference after the switch-over, and no additional information is needed from neighbor routers. Thus, the router's forwarding capability remains unaffected and a neighbor router does not notice that a system failure has occurred. Applicant respectfully submits that the cited references fail to disclose or suggest the elements of any of the presently pending claims. Therefore, the cited references fail to provide the critical and unobvious advantages discussed above.

Baskey relates to a fault tolerant recoverable TCP/IP connection router. Baskey describes an active connection router (CR) 100 and a standby connection router (CR) 105. CRs 100 and 105 are assigned a function and a state on a per Virtual Encapsulated Cluster (VEC) basis. Standby CR 105 monitors major activities of active CR 100, so that configuration and connection tables 107 and 106 of active CR 100 and standby CR 105 are synchronized. Standby CR 105 switches states and becomes the active CR when active CR 100 fails. Standby CR 105 performs IP takeover by issuing a gratuitous ARP message, i.e., an ARP message to itself. The gratuitous ARP is broadcasted to all directly attached networks belonging to the logical subnet of the VEC. Previous hop(s) IP routers 130 and 140 update their ARP tables. The ARP table update causes all traffic for the VEC to go to the new active CR 105. This process of Baskey eventually causes all IP packets destined to the VEC addresses to flow through the now active CR 105.

Srikanth relates to a method and apparatus providing for router redundancy of non-internet protocols using the virtual router redundancy protocol. Srikanth describes a router providing router redundancy and fail-over protection for Internet Protocol. Srikanth also describes that next hop routers can be dynamically configured at each node,

using a dynamic routing protocol such the Routing Information Protocol (RIP) or Open Shortest Path First (OSPF) dynamic routing protocols. The reliability provided by a dynamic routing protocol is at the expense of the node and router processing overhead, network overhead, interoperability problems, and the like, according to Srikanth. Referring to Figure 3 of Srikanth, node 115 waits until it has an IPX datagram to transmit to another node in a different IPX network and before it checks an internal table or cache, such as an RIP table, at step 320, for a MAC address associated with the IPX address of the next hop IPX router.

Applicant submits that that Baskey and Srikanth, either alone or in combination, do not disclose or suggest all the features of the presently pending claims. For example, applicant submits that the cited references do not disclose or suggest switching the router to the standby processor when a failure is detected at the active processor, wherein all states of the link protocol immediately function as if the failure had not occurred. Baskey describes standby CR 105 issuing a message when a failure in active CR 100 occurs. This message is then broadcasted to hop routers so that the routers can update their tables to forward packets to CR 105. Srikanth describes waiting for an IPX datagram at a node before checking an internal table or cache. Baskey and Srikanth, therefore, describe broadcasting or waiting for messages before reacting to a failure. These aspects of the cited references do not disclose or suggest having all states of the link protocol immediately function as if the failure had not occurred.

Applicant also submits that the cited references do not disclose or suggest transferring protocol information from a hidden OSPF interface of an active processor

means to a hidden OSPF interface of the standby processor means over a communications link to mirror states of the active processor means and the standby processor means, or removing the hidden interface of the active processor means and the hidden interface of the standby processor means. Baskey does not disclose or suggest using hidden interfaces between active CR 100 and standby CR 105. Therefore, Baskey does not disclose or suggest removing hidden interfaces when a failure is detected in an active processor means. Srikanth does not disclose or suggest using hidden interfaces between the nodes or routers in its redundancy protocols. Thus, Srikanth also does not disclose or suggest removing hidden interfaces when a failure is detected in an active processor means.

In contrast, claim 1 recites “wherein all states of said link protocol immediately function as if the failure had not occurred.” Claims 11, 12 19, 37 and 38 also include these features. Claim 13 recites “removing said hidden interface of said active processor means and said hidden interface of said standby processor means.” Claim 39 also includes these features. Applicant submits that Baskey and Srikanth do not disclose or suggest at least these features of the presently pending claims.

Further, applicant submits that Srikanth teaches away from its combination with Baskey. Srikanth states that “hop routers can be dynamically configured at each node, using a dynamic routing protocol such as . . . Open Shortest Path First (OSPF) dynamic routing protocols.” Srikanth, column 1, lines 46-50. Srikanth describes the dynamic routing protocols as being undesirable because “the reliability provided by a dynamic routing protocol is at the expense of node and router processing overhead, network

overhead, interoperability problem, etc.” Srikanth, column 1, lines 50-53. Thus, applicant submits that Office Action does not provide any evidence of a motivation or suggestion in the cited references, or in the knowledge available to one skilled in the art, to combine the references in view of the undesirability of dynamic routing protocols as expressed by Srikanth. “It is improper to combine references where the references teach away from their combination.” In re Grasselli, 713 F.2d 731, 743; MPEP 2145. Because Srikanth teaches away from its combination with Baskey to achieve a dynamic routing protocol, applicant respectfully submits that the obviousness rejection of these claims is improper. Thus, applicant respectfully requests that the obviousness rejection of claims 1-6, 9-14, 16-23, 25-40 and 42-44 be withdrawn.

Claims 7, 8, 15, 24 and 41 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Baskey in view of Official Notice taken by the Office Action. The Office Action took the position that Baskey taught all the elements of these claims except that the link protocol information is in the form of Inter Process Control (IPC) messages. The Office Action then took Official Notice that the concept and advantages of IPC are well known and expected in the art, as evident by the Microsoft Computer Dictionary (Fifth Edition). Applicant respectfully traverses the obviousness rejection and submits that the cited reference, either alone or in combination with the Official Notice, does not disclose or suggest all the features of any of the presently pending claims.

Claims 7 and 8 depend indirectly from claim 1. Claim 1 is summarized above. Applicant submits that claims 7 and 8 include the patentable features of claim 1, as discussed above.

Claim 15 depends indirectly from claim 13. Claim 13 is summarized above. Applicant submits that claim 15 includes the patentable features of claim 13, as discussed above.

Claim 24 depends indirectly from claim 19. Claim 19 is summarized above. Applicant submits that claim 24 includes the patentable features of claim 19, as discussed above.

Claim 41 depends directly from claim 39. Claim 39 is summarized above. Applicant submits that claim 41 includes the patentable features of claim 39, as discussed above.

Baskey is summarized above. Applicant submits that Baskey does not disclose or suggest all the features of claims 7, 8, 15, 24 and 41 for at least the reasons given above.

The Office Action took Official Notice that IPC is well known and expected in the art. Applicant submits that the Official Notice is improper. The Office Action does not provide any documentary evidence to support the Official Notice, except reference to a Microsoft Computer Dictionary. The text or copy of the dictionary entry is not provided. "Official notice unsupported by documentary evidence should only be taken by the examiner where the facts asserted to be well-known, or to be common knowledge in the art are capable of instant and unquestionable demonstration as being well-known." MPEP 2144.03. Applicant submits that the Office Action has not shown that the features of the claims are capable of instant and unquestionable demonstration as being well-known. Thus, applicant maintains that the taking of Official Notice is improper.

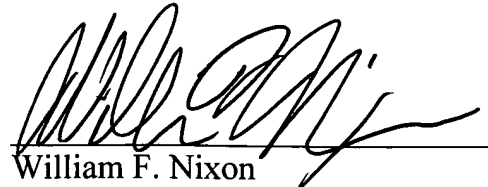
To further prosecution, however, applicant addresses the rejection of claims 7, 8, 15, 24 and 41. Applicant submits even if the teachings of the Official Notice are accepted, which applicant does not admit, that the features of these claims missing from Baskey are still not disclosed or suggested. Further, claims 7, 8, 15, 24 and 41 depend directly or indirectly from claims 1, 13, 19 and 37. As discussed above, claims 1, 13, 19 and 37 are nonobvious in view of the cited references. If an independent claim is nonobvious, then any claim depending therefrom is also nonobvious. MPEP 2143.03. Thus, claims 7, 8, 15, 24 and 41 are nonobvious. For at least these reasons, applicant respectfully requests that the obviousness rejection of claims 7, 8, 15, 24 and 41 be withdrawn.

Applicant further submits that each of claims 1-44 recite subject matter that is neither disclosed nor suggested by the cited references, either alone or in combination. Applicant therefore respectfully requests that all of claims 1-44 be allowed, and this application passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the applicant's undersigned attorney at the indicated telephone number to arrange for an interview to expedite the disposition of this application.

In the event this paper is not being timely filed, the applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account 50-2222.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'W. F. Nixon', is written over a horizontal line.

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